

# A Record of Hastings River Mouse (*Pseudomys oralis*) in a Fox (*Vulpes vulpes*) Scat from New South Wales

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The Hastings River mouse (*Pseudomys oralis*) is a threatened Australian mammal listed as endangered on the 'NSW Threatened Species Conservation Act 1995' and 'Commonwealth Endangered Species Protection Act 1992' and vulnerable on the 'Queensland Nature Conservation Act 1992'. Predation by the fox (*Vulpes vulpes*) is identified as one of the key threatening processes although there has been no evidence to support this theory. Despite many predator scat surveys having been conducted throughout the geographical range of the species, only recently has any evidence of *V. vulpes* predation on the species been determined. This short note describes the first published record of *P. oralis* in a *V. vulpes* scat, collected in Marengo State Forest, NSW.

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KEYWORDS: fox, Hastings River mouse, predation, scat analysis.

## INTRODUCTION

*Pseudomys oralis* only occurs in New South Wales and Queensland in tall open eucalypt forests at altitudes between 410–1250 metres above sea level (A.P. Smith unpub. data). Evidence suggests that the species was once more widely distributed along the east coast of Australia (NPWS unpub.). The main threats to the species are unknown and ecological research to study the biology of the species has been hampered by low capture success, low abundance and a patchy distribution (Read 1993; King 1984). A draft recovery plan has been prepared for this species in NSW (NPWS unpub.) where it is proposed that *V. vulpes* predation is one of five threatening processes. To date these threatening processes have been unproven and there has not been any evidence of *P. oralis* in *V. vulpes* scats although the species is considered to be in the critical weight range (after Burbidge and McKenzie 1989) vulnerable to *V. vulpes* predation.

The only record of *P. oralis* in mammalian predator scats has been recorded in a study of the diet of *Canis lupus familiaris* in the Oxley Wild Rivers National Park (Robertshaw and Harden 1985). Evidence of forest owl predation has been reported by Kirkpatrick (1995) and Read (1987). The occurrence of *P. oralis* in predator scats and owl pellets is not conclusive evidence that predation is a key threat to the species, and given the rarity of the occurrence and the difficulty in trapping this species, it is likely that quantifiable threats will be extremely difficult to accurately determine.

## METHODS

In May 1999, as a part of pre-logging surveys, a State Forest employee (Bill Browning) collected numerous *V. vulpes* scats along a forestry road in Marengo State



Figure 1. New South Wales showing the location of Marengo State Forest.

Forest (Fig. 1). Hairs from the scats were analysed using standard cross-hair analysis methods (Brunner and Coman 1974). Lower jaw bones were extracted from one scat and sent to the Queensland Museum for identification.

## RESULTS

Analysis determined that the scat was composed of hair from a *Pseudomys* sp., although the distinguishing features were difficult to identify accurately using cross-section analysis. The structure of the hair mounts in the *Pseudomys* spp. are very similar and overlapping diagnostic features between *P. oralis*, *P. gracilicaudatus*, *P. novaehollandiae* and *P. australis* can complicate accurate identification (Fig. 2). These *Pseudomys* species all have oval guard hairs and circular overhairs that can only be distinguished by measuring the maximum diameter of the hairs and the width of the hair cortex. Precise identification can also be complicated by damage to the hair's outer scales and distortion of hair shapes caused by the digestive processes of the predator. In this investigation the hairs were damaged and confirmation of the species using dentition analysis was referred to the Queensland Museum. Results from the examination of the lower jaw and teeth revealed that the distinctive high molar crowns (upper and lower) and independent lophs were apparent, typical of *P. oralis* (Fig. 3), therefore distinguishing it from the other *Pseudomys*.

## DISCUSSION

*P. oralis* is believed to be at risk of extinction due to a number of threatening processes including predation by *V. vulpes* (NPWS unpub.). This record of *P. oralis* in a

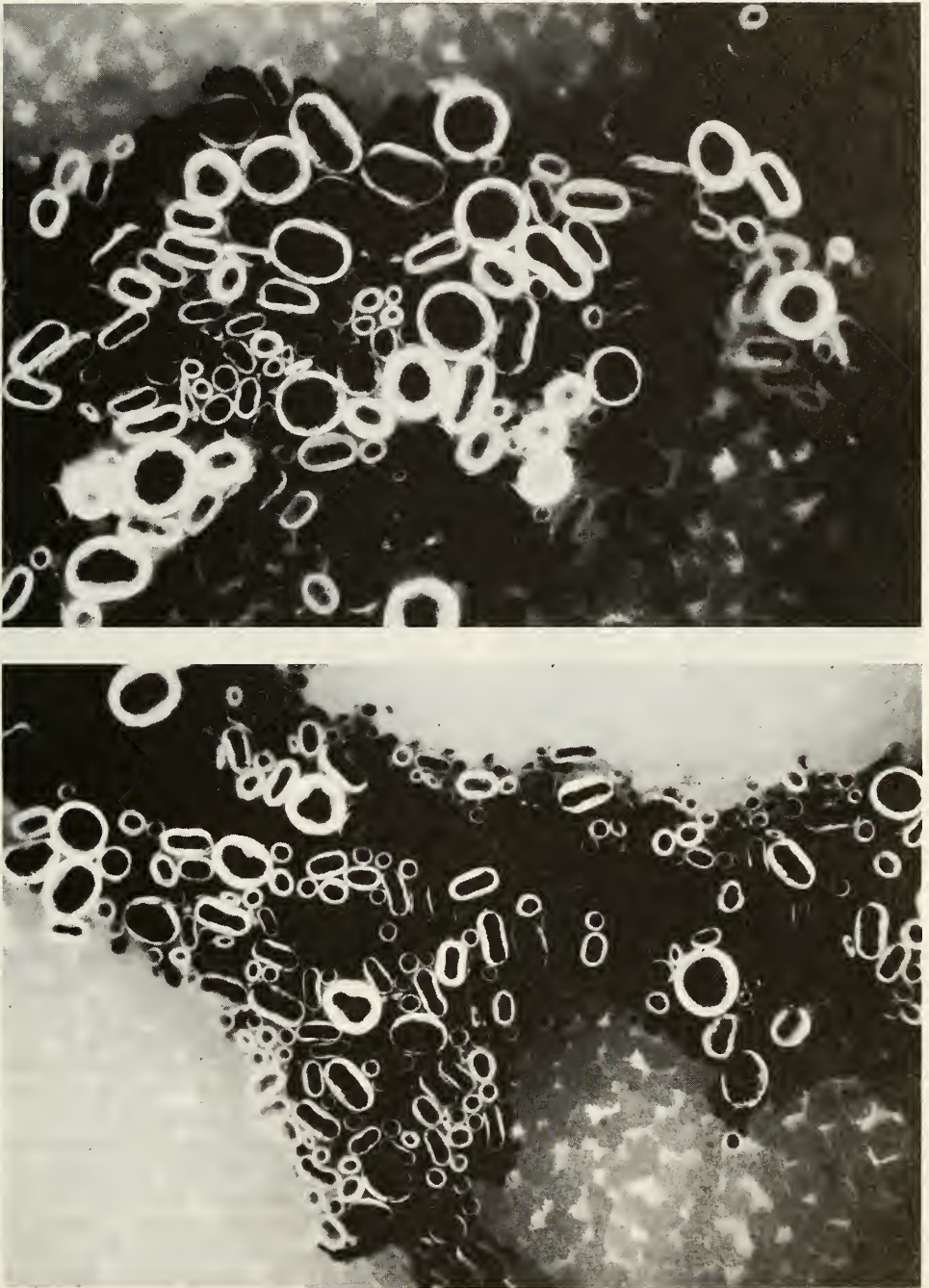


Figure 2. Cross-section of hair from *P. oralis* (above) and *P. novaehollandiae* (below) showing similar diagnostic features.



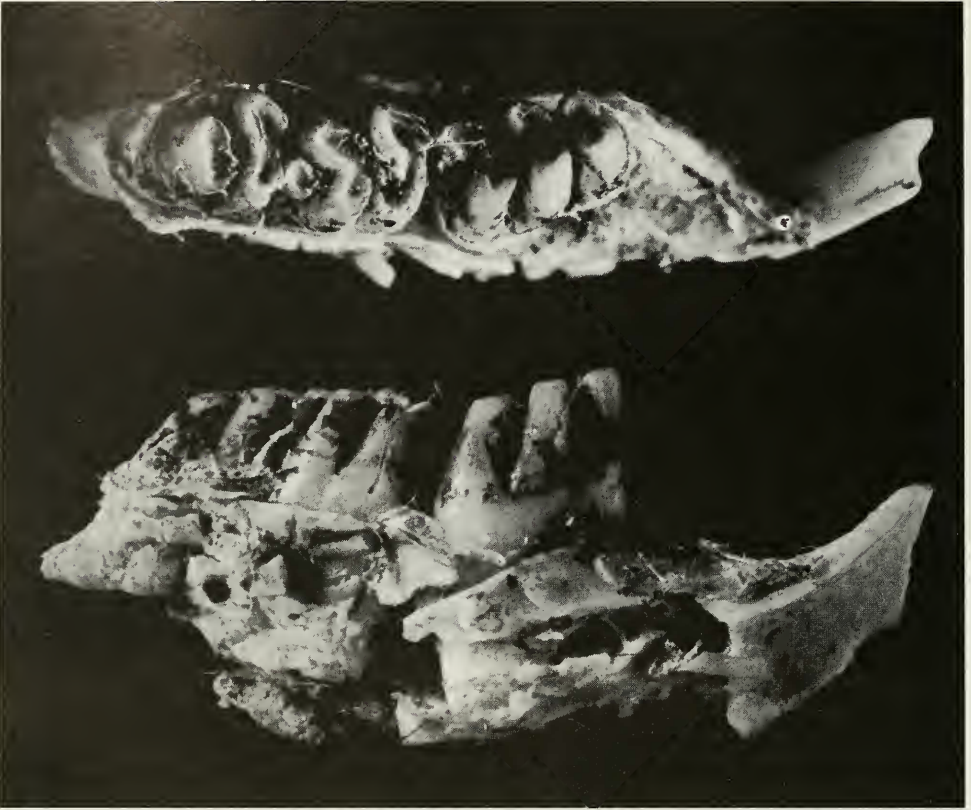


Figure 3. Lower jaw and teeth of *P. oralis*, note the distinctive high molar crowns and independent lophs.

*V. vulpes* scat and a second occurrence in a fox scat from the Border Ranges (D. Charley pers. comm. 1999) indicate that foxes could pose a threat to *P. oralis* although there is no conclusive evidence of predation. *V. vulpes* are scavengers and the interpretation of scat survey data should acknowledge that not all food items of *V. vulpes* are the result of predation (Meek and Triggs 1998).

More information is still needed to clarify all the causal factors influencing the low abundance of the species in the eastern states. Recent studies (S. Townley pers. comm. 1999) suggest that a major threat could be posed by grazing and/or increased fire frequency, although this theory is yet to be tested. Experimentally designed studies are needed to assess what threatening processes affect this species and to make recommendations for the protection of the remaining populations based on a test-of-hypothesis based inquiry. An investigation of grazing and burning practices and their effect on *P. oralis* may be the key to learning more about this cryptic species. Predator-prey experiments to determine whether foxes are a threat can be very difficult to conduct and it is questionable whether this is more important than issues associated with burning and grazing.

State Forests are planning predator suppression programs in areas of high species richness to reduce the potential threats to all threatened species, including *P. oralis* (P. Meek and J. Shields unpub). This may have value in suppressing predators but the ability to test *V. vulpes* impacts is limited by low target population density and compounding effects of other predators, competitors and the availability of food and shelter.

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